DEC STD 030-3
MODULE MANUFACTURING STANDARD — COMPONENT SELECTION RULES

DOCUMENT IDENTIFIER: A-DS-EL00030-03-0 Rev D, 17-June-1991

ABSTRACT: This section of DEC STD 030 provides rules and guidelines for selecting components for all printed-wiring boards.

APPLICABILITY: This section is mandatory for designs to be compatible with the standard volume manufacturing process. Site Producibility Engineers are available to provide additional information on specific areas not covered in this standard.

STATUS: APPROVED 17-June-1991; use VTX SMC for current status.

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APPROVAL: This document has been reviewed and recommended for approval by the DEC STD 030 Advisory Committee and the General Review Group for its category.

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CONTENTS

1 INTRODUCTION 1
2 COMPONENT SELECTION ASSISTANCE 1
3 GENERAL COMPONENT SELECTION RULES 4
4 SURFACE MOUNT COMPONENT SELECTION RULES 5
APPENDIX A — COMPONENT ANALYSIS PROCEDURE 7
APPENDIX B — SURFACE MOUNT COMPONENT SPECIFICATIONS 9
REFERENCED DOCUMENTS 11
DEC STD 030-3 RULES INDEX 13

INDEX

EXHIBITS

1 Group Component Engineering Managers 1
2 Corporate Component Engineering Cross Group Commodity Contacts 2
3 Surface Mount Component Specifications 9

1 INTRODUCTION

This section of DEC STD 030 provides rules and guidelines for component selection for all printed-wiring boards.

2 COMPONENT SELECTION ASSISTANCE

To obtain assistance in component selection, contact the appropriate group component engineering manager listed in Exhibit 1. For issues or questions relating to a specific commodity, contact the individual listed in Exhibit 2.

Exhibit 1: Group Component Engineering Managers

Rao Yedavalli	Low End Systems
Jules Deschamps	Computer Subsystems Technology Group
Mary Casey	Telecommunications and Network Manufacturing
Ken Hall	Storage Systems East
Ron Watts	Storage Systems West
Joe Belliveau	GIA
Pat Flanagan	Europe
Raktim Nath	Corporate LSI (Component/Packaging Engineering Mgr)
Ken Stanvick	Corporate LSI (Manufacturing Engineering Mgr)
Gary Hoppe	Corporate LSI (Test Engineering Mgr)
Terry Steiner	Corporate LSI
Dave Caruso	Corporate DRAMS
Maria Menendez	Corporate DEC LSI
Kevin Brown	Corporate DEC LSI Material
Dave Saliba	Corporate Hybrids
Nelson Simkins	Corporate Packaging
Dennis Mattson	Corporate Labels
Gerry Gagnon	Corporate PWB
Paul Rey	Corporate Component Engineering

Additional information on insertable components can be obtained from EL-MF228-00, *Component Categories and Codes for Machine- and Non-Machine-Insertable Components*.

Exhibit 2: Corporate Component Engineering Cross Group Commodity Contacts

Device Class	Commodity	Component Engineer	Organization
10	Capacitor	Charlie Lahaye	LSE CE
11	Diode/Cross	John Funaro	USSM CE
12	Switch	Gil Woolley	LES CE
	Relay	John Shaw	USSM CE
	Solenoid	Gil Woolley	LES CE
	Fuse	John Shaw	USSM CE
	Contactor	Nelson Carbonell	T&NM CE
	Circuit breaker	John Shaw	USSM CE
	Mechanical, motors,	Dave Schmidt	SSE CE
	AC Induct, DC	John Wishart	SSW CE
	Brushless kit, int spindle	Gerry Cronin	SSE CE
	Heat transfer	Ed Lee	LES CE
	Connector	Colleen Murphy	USSM CE
	Cooling	Jason Pei	USSM CE
	EMI filters	Barry Williams	USSM CE
13	Resistor/SIP	John Shaw	USSM CE
14	PWB materials	Gerry Gagnon	CORP PWB
15	Transistor	Roger Lachapelle	LES CE
16	Magnetics	Harry Shah	LES CE
	Delay lines	Joe Collins	T&NM CE
17	Cable Assemblies		
	General	Van Huynh	USSM CE
	Communications	Lance MacLellan	T&NM CE
	Optical	Nelson Carbonell	T&NM CE
	Power cord	Rao Yedavalli	LES CE
	Molded cable	Fran Sleeper	LES CE
18	Crystals/oscillators	Roger Lachapelle	LES CE
19	LSI bipolar		
	Logic	Tim Tripp	SBO ENB
	PALS	John Whitcraft	SBO ENB
	Standard linear	Sam Sattari	SBO ENB
	Custom linear	Larry Wasko	SBO ENB
	Memory	Robin Stewart	SBO ENB
	Microprocessor	Gautam Das	SBO ENB
	Microcontroller	Ken Siple	SBO ENB
	ASIC	John Kelly	SBO ENB

Device Class	Commodity	Component Engineer	Organization
20	Hybrids	Dennis Johnson	PNO Lab
	DRAM SIPs	Dave Caruso	MEM ENG
21	LSI MOS		
	Logic	Tim Tripp	SBO ENB
	Standard linear	Sam Sattari	SBO ENB
	Custom linear	Larry Wasko	SBO ENB
	Memory	Robin Stewart	SBO ENB
	Microprocessor	Gautam Das	SBO ENB
	Microcontroller	Cathy Peterson	SBO ENB
	ASIC	Satish Soman	SBO ENB
23 (See Note)	LSI Programmable		
	Hot line	See Note	
	PALS/FPLA	Kevin Burbick	SBO ENB
	EEPROMS	Mark Ferraro	SBO ENB
	Microprocessor	Ken Siple	SBO ENB
	Microcontroller	Cathy Peterson	SBO ENB
	EPROM/PROM	Mark Ferraro	SBO ENB
10, 12, 48, 49	LSI Material for DEC LSIs	Kevin Brown	SCO ENG
24	Fiber optics, active	Nelson Carbonell	T&NM CE
30	Power supplies	P.S. Venkatraman	USSM CE
	Un–interruptable Power Source (UPS)	Bernie Nolan	Design Lab
36	Labels	Dennis Mattson	Graphic Design
48	Metals, raw	Tim Holland	SME
50	PWB, bare	Gerry Gagnon	Corp PWB
74	Mechanical fab	Dave Schmidt	SHR CE
90	Hardware	Dave Schmidt	SHR CE
91	Wire/cable	Lance MacLellan	T&NM CE
99	Packaging materials	Nelson Simkins	PACK CE
	Component carriers	Steve Spaulding	Assy Syst

Note: Refer to Notes file, ANT::23CLASS SEMICONDUCTOR or call the Hotline, DTN: 228–5500.

3 GENERAL COMPONENT SELECTION RULES

It is recommended that a component analysis for all parts used in a design be performed by Component Engineering. The procedure for component analysis varies among groups. A sample component analysis procedure is provided in Appendix A. Contact your Producibility Engineer for further information.

RULE 3000: TANTALUM CAPACITORS

The use of tantalum capacitors is allowed but should be avoided where possible because of their expense and safety issues. See DEC STD 030-5, Rule 5240.

RULE 3010: GOLD-PLATING ON CONTACTS

If gold-plating is needed on the mating end of a contact, have the remainder of the contact tin plated.

RULE 3011: GOLD- AND SILVER-PLATED LEADS FOR SOLDERED COMPONENTS

Do not use gold- and silver-plated leads for soldered components.

RULE 3012: TIN PLATING ON COMPONENT LEADS

Tin plating on component leads shall be a minimum of 200 microinches thick to ensure shelf life.

RULE 3015: EXPOSED SILVER

Do not use any components that have exposed silver. Silver migration, over time, affects product reliability. Contact Component Engineering for further information.

RULE 3020: QUALIFIED PARTS AND VENDORS

Use parts from the Corporate Preferred Parts List. These devices are compatible with the manufacturing process; that is, they can complete the assembly process without degradation. Introduction of new or nonpreferred parts must be worked with Producibility and Component Engineering. The following data bases can be used to select preferred parts.

a. Specs on Computer (SPOC)

b. Automated Part and Product Information Exchange (APPIX) Bill of Materials (BOM) Analysis

c. Producibility Automation and Cost Estimator (PACE)

A device that has been qualified in a through-hole package is not automatically qualified in a surface mount package. Additional qualification testing must be performed to ensure manufacturing process compatibility. Contact Component Engineering or Producibility Engineering.

RULE 3030: OBSOLETE COMPONENT TECHNOLOGY

Do not use obsolete component technology, such as parts labeled *risky* or *not recommended for new designs*.

RULE 3040: CARBON COMPOSITION RESISTORS

Avoid selecting carbon composition resistors due to expense and lack of availability.

RULE 3050: VITREOUS-COATED WIRE-WOUND POWER RESISTORS

Avoid selecting vitreous-coated wire-wound power resistors.

4 SURFACE MOUNT COMPONENT SELECTION RULES

Samples of footprint patterns for common component packages may be found in EL-EN705-00, *Footprint Patterns for Surface Mount Technology*. Refer to DEC STD 030-10, *Footprint Design for Surface Mount Technology* for design requirements and guidelines.

All component library entries in CAD tools shall include the appropriate package type, for example *SOIC8*, in a component field such as the package name field in VLS. Appendix B lists general specifications for surface mount components.

RULE 3060: USE OF METRIC SURFACE MOUNT COMPONENTS

Metric surface mount components are allowed subject to the following guidelines.

a. Select U.S. customary components if available.

b. Only the following lead pitches will be supported by process development.

0.50 mm
0.65 mm
0.8 mm
1.0 mm

RULE 3070: USE OF LEADLESS CERAMIC CHIP CARRIERS

Leadless ceramic chip carriers (LCCCs) shall not be selected as surface mount components due to differences in the coefficient of thermal expansion between the ceramic part and the substrate (bare board material).

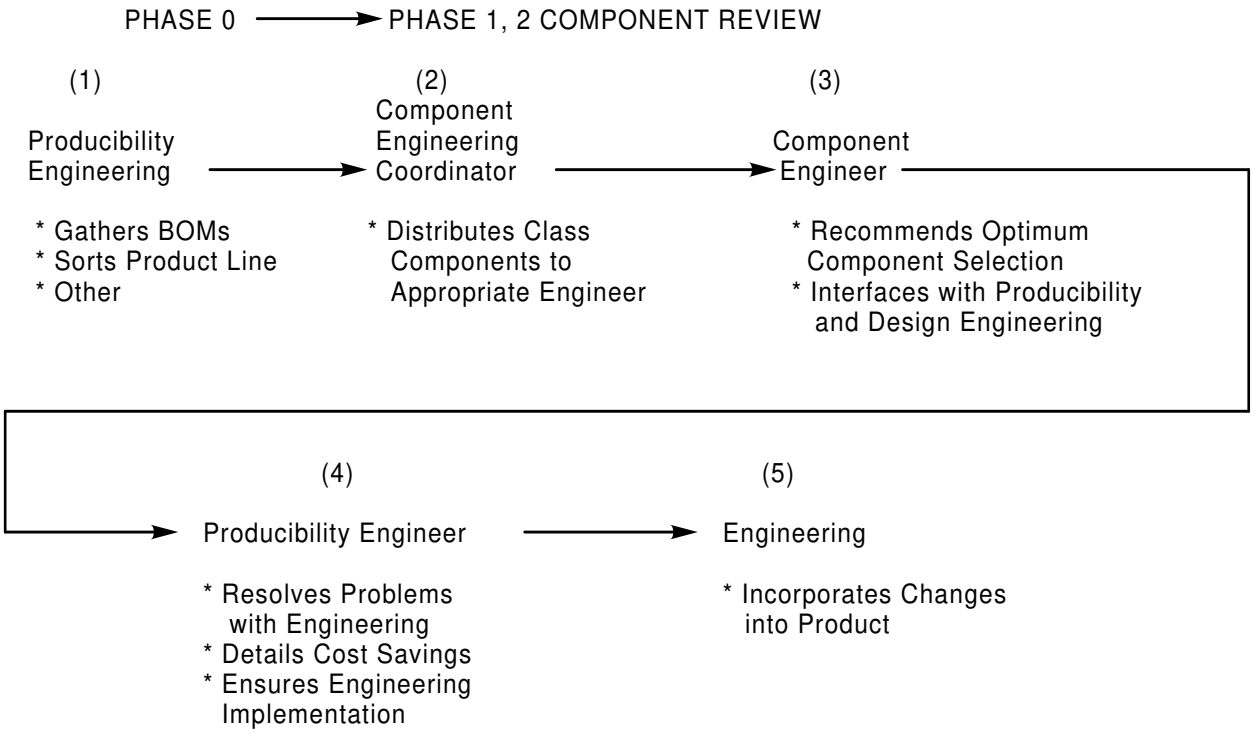
RULE 3080: USE OF PLASTIC LEADED CHIP CARRIERS

Some devices packaged in plastic leaded chip carriers (PLCCs) were qualified for socketed assembly only. Programmable devices such as programmable read-only memory (PROM), programmed-array logic (PAL), and others are only available in PLCC. Because PLCCs of 44 and more pins require costly handling or preconditioning to eliminate moisture, alternate packaging should be sought.

RULE 3090: COMPONENT LEAD METALLIZATION AND MECHANICAL FEATURE TOLERANCES

Component lead metallization and mechanical feature tolerances shall meet the component specifications for SMT requirements. Refer to the component specifications listed in Appendix B for details.

APPENDIX A — COMPONENT ANALYSIS PROCEDURE



DESCRIPTION OF EVENTS

STEP

1. Producibility Engineering gathers BOMs and other product information and sorts product lines to A, B, or C (auto, hand, surface mount assemblies, and so forth).
2. Producibility Engineer delivers *Component Analysis* to Component Engineering coordinator. The Component Engineering coordinator distributes information to the appropriate component engineer.
3. Component engineer works with Design Engineering and Producibility Engineering to analyze optimum component selection for that specific product. Recommendations are detailed in a written report.
4. Producibility Engineering ensures that recommendations are reviewed and implemented when appropriate.
5. Engineering incorporates the changes and/or recommendations.

APPENDIX B — SURFACE MOUNT COMPONENT SPECIFICATIONS

The following chart lists the general requirements for surface mount components.

Exhibit 3: Surface Mount Component Specifications

General Specification	Acceptable Surface Mount Components
10–00105–GS	Ceramic Chip Capacitors
10–00106–GS	Tantalum Chip Capacitors
11–00006–GS	Switching Diode – SOT23
11–00007–GS	Zener Diode – SOT23
13–00013–GS	Chip Resistor
13–00016–GS	Resistor Networks
15–00004–GS	Transistor – SOT23
19–00007–GS	CLCCs
19–00013–GS	PLCCs
19–00017–GS	SOICs

REFERENCED DOCUMENTS

EL-Class Digital Documents

EL-Class Number	Document Title
EL-00030-05	*DEC STD 030-5 Module Manufacturing Standard — Module Assembly and Component Insertion Rules*
EL-00030-10	*DEC STD 030-10 Module Manufacturing Standard — Footprint Design for Surface Mount Technology*
EL-00140-00	*DEC STD 140-0 Documentation, Data, and Release Requirements for Printed-Wiring Boards, Modules, and Backplanes*
EL-EN705-00	*Footprint Patterns for Surface Mount Technology*
EL-MF228-00	*Component Categories and Codes for Machine- and Non-Machine-Insertable Components*

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Digital General Specifications

The general specifications listed in Exhibit 3 are available from any Microfilm Reference File (35 mm aperture card "tub") or the SPOC system.

DEC STD 030-3 RULES INDEX

Rule 3000: Tantalum Capacitors, 4
Rule 3010: Gold-Plating on Contacts, 4
Rule 3011: Gold- and Silver-Plated Leads for Soldered Components, 4
Rule 3012: Tin Plating on Component Leads, 4
Rule 3015: Exposed Silver, 4
Rule 3020: Qualified Parts and Vendors, 4
Rule 3030: Obsolete Component Technology, 5
Rule 3040: Carbon Composition Resistors,5
Rule 3050: Vitreous-Coated Wire-Wound Power Resistors, 5
Rule 3060: Use of Metric Surface Mount Components, 5
Rule 3070: Use of Leadless Ceramic Chip Carriers, 5
Rule 3080: Use of Plastic Leaded Chip Carriers, 6
Rule 3090: Component Lead Metallization and Mechanical Feature Tolerances, 6

INDEX

A

Automated Part and Product Information Exchange (APPIX) Bill of Materials (BOM) Analysis, 4

C

Carbon Composition Resistors, 5
Ceramic
  Chip Capacitors, 9
Chip
  Capacitors, 9
CLCCs, 9
Component
  Analysis, 4, 7
  Lead Metallization, 6
  Library, 5
  Metric Surface Mount, 5
  Review, 7
  Selection, SMT, 5
  Selection Engineering Managers, 1
  Specifications, SMT, 9
  Technology, Obsolete, 5
Corporate
  Preferred Parts List, 4

E

Exposed Silver, 4

G

Gold
  Plating, 4

L

LCCCs
  See Leadless Ceramic Chip Carriers
Leadless Ceramic Chip Carriers (LCCCs), 5

M

Manufacturing
  Process Compatibility, SMT, 4
Mechanical
  Feature Tolerances, 6
Metric Components, SMT, 5

O

Obsolete Component Technology, 5

P

PACE, 4
Parts
  List, Corporate Preferred, 4
PLCCs, 6, 9
Power
  Resistors, 5

R

Resistor
  Carbon Composition, 5
  Vitreous-Coated Wire-Wound, 5

S

Silver
  Migration, 4
  Plated Leads, 4
Small Outline ICs (SOICs), 9
Specs on Computer (SPOC), 4
Switching Diode, 9

T

Tantalum Capacitors, 4, 9
Tin Plated
  Component Leads, 4
  Contact, 4
Transistor, 9

V

Vitreous-Coated Wire-Wound Power Resistors, 5

Z

Zener Diode, 9

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